**Background:**

Lab Activity: It’s Yeast!

Yeast are tiny single celled (unicellular) fungi. Fungi are heterotrophic, and therefore cannot make their own food. They rely on sugar found in their environment to provide them with energy so they can grow and reproduce.

Yeast, much like bacteria and archaea, will grow in their food source. They produce and release digestive enzymes into their environment. Once there, the enzymes break down sugar polymers into smaller molecules. The smaller molecules are then absorbed and taken in by the yeast. Once inside glycolysis and fermentation can proceed.

**Materials:**

* 2 different 250ml beakers
* 100 ml warm water – (23OC to 30OC)
* 4g active dry yeast – (one package worth)
* 9g sugar
* 4 balloons
* 4 rubber bands
* A test tube rack with 4 different test tubes
* Graduated cylinder

**Hypothesis:**

During today’s lab you will be putting yeast in a warm water solution and adding various amounts of sugar to the solution. We will measure the amount of alcoholic fermentation based on the amount of CO2 produced by the yeast. This will be measured by the inflation and the mass of a balloon.

**Procedure:**

1. Obtain all of the required materials and put them on the table in front of you. Put a piece of paper under your test tube rack that will allow you to label the 4 test tubes. The test tubes should be labeled A, B, C and D.
2. Make sure that your water is the correct temperature. Yeast that is subjected to cold water or hot water will die and will not be able to perform the experiment today.
3. Take your 4g of yeast and add them to 100ml of warm water. Gently swirl the beaker gently with your hands. Do not stick your fingers in the water. Yeast that are stirred too aggressively will not perform the same. Continue to swirl your mixture for a full two minutes.
4. Place 20ml of yeast mixture in test tube B, C and D.
5. Now we are going to add our solutions to each of the test tubes. Take 10ml of warm water and add it to test tube A.
6. Take 10ml of warm water and add it to test tube B.
7. Take 3g of sugar and dissolve it in 10ml of warm water. Add the mixture to test tube C.
8. Take 6g of sugar and dissolve it in 10ml of warm water. Add the mixture to test tube D.
9. Cap each test tube with a balloon. Make sure that the balloon is secure by using a rubber band to secure the balloon to the test tube.
10. We are going to check our yeast at 7 minute intervals. During this time all data and observations will be recorded in data table 1.1 and data table 1.2.
11. Once the experiment has concluded, wash all test tubes and beakers with soap and water. Make sure to scrub the beakers with a test tube brush.

**Data:**

Data Table 1.1- Observations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Time** | **A - Control** | **B – No Sugar** | **C – 3g Sugar** | **D – 6g Sugar** |
| **7** |  |  |  |  |
| **14** |  |  |  |  |
| **21** |  |  |  |  |
| **28** |  |  |  |  |
| **35** |  |  |  |  |
| **42** |  |  |  |  |

Data Table 1.2 – Balloon Inflation

1 – No inflation

2 – Signs of inflation

3 – Balloon has no wrinkles

4 – Balloon is limp but inflated

5 – Balloon is partially inflated but not fully standing

6 – Balloon is standing on its own and inflated

7 – Balloon has expanded in size

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Time** | **A - Control** | **B – No Sugar** | **C – 3g Sugar** | **D – 6g Sugar** |
| **7** |  |  |  |  |
| **Diameter in mm** |  |  |  |  |
| **14** |  |  |  |  |
| **Diameter in mm** |  |  |  |  |
| **21** |  |  |  |  |
| **Diameter in mm** |  |  |  |  |
| **28** |  |  |  |  |
| **Diameter in mm** |  |  |  |  |
| **35** |  |  |  |  |
| **Diameter in mm** |  |  |  |  |
| **42** |  |  |  |  |
| **Diameter in mm** |  |  |  |  |

**Conclusion:**

**Analysis Questions:**

1. What was our control for this experiment? Why?
2. What were our dependent and independent variables for this experiment? Why?
3. What caused a change in the balloon?
4. Did sugar change the results of the experiment?
5. How did the amount of sugar change the experiment?